and embodies some fresh facts regarding their spicular structure, as well as descriptions of five new species. From the close similarity between the minute spicular characters of these species and those of existing Calcisponges, the writer believes that the originally calcareous composition of the fossil forms can no longer be disputed. He also believes that the majority of the Pharetones possessed a "dermal layer of quadriradiate (?) spicules." The affinities of *Palæocampa*, Meek and Worthen, as evidence of wide diversity of type in the earliest known Myriopods, by S. H. Scudder.——In the October number of the Geological Magazine H. H. Howorth continues his argument in favor of the occurrence of a great Post glacial flood by examining the evidence of the Angular drift which overlies much of the land on either side of the English channel. The unrolled surface of these stones, the presence among them of land-shells and quadrupedal bones, the want of stratification, and the lack of marine beaches and of marine organisms throughout this layer, are to the author eloquent evidence of their deposition by a sudden and violent flood. The absence of river shells, and the lack, throughout the section of the English channel, of any smooth trough such as a river would form, are against the fluviatile origin of this drift, as is also the character of the drift itself, so widely different from the fine mud of the deltas. Mr. Howorth promises a farther argument, but hints that the flood he postulates is not a universal or Noachian deluge; H. Woodward has a note on *Ellipsccaris dewalquei*, a new Phyllopod crustacean shield from the Upper Devonian of Belgium; N. Flight continues his history of meteorites; T. F. Jamieson continues his enquiry into the causes of the depression and re-elevation of the land during the Glacial period; and J. S. Gardner gives suggestions for a revised classification of the British Eocenes. Mr. Gardner believes that the separation of a part of the series as Oligocene is artificial as regards England. The Oligocene strata of England are the Fluvio-marine series of the Isle of Wight.——The United States Geological Survey is prosecuting work in the old States as well as in the Territories of the West. Three parties are now surveying in the Southern Appalachians. Many of the employés are local geologists.

MINERALOGY.[1]

THE MECHANICAL SEPARATION OF MINERALS.—Mechanical methods for separating the minerals composing a rock are of great value in lithological investigations, and, where possible, should be employed in advance of chemical analyses. The best method is the now well-known one of using a liquid of great density, such as a solution of mercuric iodide, in which the pul-

[1] Edited by Professor H. CARVILL LEWIS, Academy of Natural Sciences, Philadelphia, to whom communications, papers for review, etc., should be sent.

verized rock is suspended, and its constituents separated successively according to their specific gravity.

Another method, recently employed with success, depends upon the attractability of ferruginous minerals by an electro-magnet. The poles of a horseshoe electro-magnet are moved about through the pulverized substances, the strength of the magnet being increased at each succeeding experiment by the addition of greater battery power. Thus magnetite and hematite may be first extracted by a weak current, then follow ferruginous augites, hornblendes and garnets, while a stronger magnet attracts tourmaline, idocrase, bronzite, actinolite, etc., and, finally, by a still more powerful magnet, biotite, chlorite, muscovite, and even dolomite may be extracted. Minerals containing very minute percentages of iron may be attracted if the magnet is powerful enough. The gray powder of syenites and diabases may thus be separated in a few minutes into a white powder containing the non-feldspathic minerals, and a dark-colored one composed of the other constituents.

By employing the former method in conjunction with this, very accurate results may be reached.

A *phonolite*, for example, consisting of orthoclase, nephelite, augite and magnetite, was first freed from magnetite by a weak magnet, then, the strength of the current being increased, a mixture of augite and nephelite was extracted, which was finally separated into its constituents by the specific gravity method, mercuric iodide of proper density being employed. The composition of the rock was thus found to be, magnetite 4 p. c., augite 11 p. c., nephelite 48.5 p. c., orthoclase 25.5 p. c., impure feldspar, etc., 11 p. c.

AXINITE FROM BETHLEHEM.—Through the medium of the late Professor W. T. Roepper, Pennsylvania mineralogists have been familiar for several years with the specimens of axinite from near Bethlehem, Pa., the locality having been discovered by Professor F. Prime, Jr. The crystals are small, and of a pale brown color, often nearly colorless, and have the axe-like shape which has suggested the name of the species. They occur with asbestos in a hornblendic rock, and, while devoid of the beauty possessed by specimens of the same mineral from other localities, are of some crystallographic interest, as lately shown by B. W. Frazier, of Bethlehem. A close relationship has been found to exist between the crystallographic characters of axinite and those of datolite. The axial lengths closely correspond, and a comparison of the angles between similar planes shows a remarkable agreement. They are found, moreover, to correspond in habit as well as in angles. Both minerals are silicates of lime and contain boracic acid, and it is very probable that the morphological resemblance is consequent upon a resemblance in chemical composition.

SAMARSKITE FROM CANADA.—Mr. G. C. Hoffman has found irregular fragments of samarskite in Berthier county, Canada. The mineral is massive, has a sub-metallic lustre, brownish-black color, grayish-brown streak, hardness of about 6, fusing between 4 and 4.5, and specific gravity of 4.947. Its composition, according to an analysis given in the Amer. Jour. Science, Dec., 1882, is as follows:

Cb_2O_5,Ta_2O_5	SnO_2	YO	CeO	UO_3	MnO	FeO
55.41	.10	14.34	4.78	10.75	.51	4.83

CaO	MgO	K_2O	Na_2O	F	H_2O
5.38.	.11	.39	.23	(trace)	2.21.

THE CRYOLITE GROUP OF MINERALS.—J. Brandl has investigated the chemical composition of the minerals of the Cryolite group, and derives several new formulæ. Pachnolite is shown to have the composition, AlF_3, CaF_2. NaF. Thomsenolite, often confounded with pachnolite, differs from it in composition by containing one molecule of water. New formulæ are also assigned to Ralstonite and Chiolite. Prosopite, Scheerer's analysis of which shows the presence of silicon, is now shown to contain no silicon, and the following formula is assigned to it: $Ca(MgNa)Al_2(F,OH)_8$. The rare mineral, Fluellite, has probably the formula, $AlF_3 + H_2O$.

HEATING APPARATUS FOR THE MICROSCOPE.—Thoulet describes in the *Bulletin de la Société Mineralogie de France*, a new method of heating objects upon the stage of the microscope. He has constructed a small "stove," or chamber, to rest upon the stage, and to contain the object and the thermometer. It consists of a glass tube fitting into a copper cylinder which rests upon a disk of copper, furnished with lateral prolongations, which can be heated by a gas jet. The whole is insulated by resting upon a disk of cork. The temperature of the chamber can be raised by heating the prolongations of copper and lowered by introducing a current of fresh air through a small tube fixed in the side. Very exact measurements can be taken with this simple apparatus, so well adapted for determining the temperature of the disappearance of bubbles in liquid inclusions, for studying the formation of crystals at various temperatures, or for other micro-chemical investigations.

MINERALOGICAL NOTES.—Descloiseaux has described some minute crystals which occur in Pegmatite near Nantes, France, and which probably are new. They are transparent, rectangular tables, less than a millimeter in length, which become white but do not fuse when heated, and are insoluble in acids. They are probably composed of a silicate of alumina, iron and lime, and are identical with some similar crystals previously described by Bertrand from another locality in the same region.——Mallard has just published a paper upon the action of heat upon crystallized

substances, in which his former conclusions regarding *pseudo-symmetry* appear to be confirmed.——Hintze reports the discovery of *Danburite* in Switzerland, on the Scopi. The crystals were at first thought to be topaz, which they closely resemble. The angles measured corresponded closely with those of the American mineral.——A nugget of gold, weighing forty-four pounds, has been found in the Ural district. This is the largest nugget ever found in Russia.——It is reported that natural sulphuric acid has been found in large quantity in Sweetwater county, Wyoming. The ground for a space of one hundred acres or more is impregnated with the acid, which is said to be of pure quality.

BOTANY.[1]

THE INTERPRETATION OF SCHWEINITZIAN AND OTHER EARLY DESCRIPTIONS.—In working up the flora of Iowa, it has been necessary in a number of instances to identify Schweinitzian species of microscopic fungi. I have had in the Herb. Curtis and Ravenel's Exsiccati, specimens upon the same species of host recorded by Schweinitz, and from the same immediate locality, to compare with his descriptions. In several cases I have been quite confounded to find that no reasonable interpretation of his language would make the descriptions fit the undoubted duplicates of the originals from which the descriptions were taken. The following instances, which have probably puzzled many other botanists, will serve as illustrations:

The uredineous fungus, abundant on various species of Lespedezæ, forming blackish spots on the leaves, and now known as *Uromyces lespedezæ*, is quite fully described by Schweinitz, under the genus Puccinia. He makes two species, one of which has spores that are distinctly two-celled or bilocular, and the other those that are sub-bilocular. In the former he says the "septum is situated *exactly in the middle* of the spore," while in the latter it is barely conspicuous (Syn. Fung. Car., p. 73). A glance under a common microscope, however, reveals the incongruous fact that the spores are but one-celled, and that there is *not even a shadow of a septum*. How is such an egregious blunder to be reconciled with the accuracy characteristic of science and scientific men? This cannot be a slip of the pen, for in his Synopsis of North American Fungi, published nine years later, there is no correction, and the species still remain in the genus Puccinia, which would not be the case if he had ascertained in the meantime that the spores were unicellular.

Another equally remarkable instance is that of the common Uromyces on Desmodium. In the earlier work the spores are said to be obscurely septate with very long pellucid pedicels (l. c., p. 74). In the later work he describes the species at greater

[1]Edited by PROF. C. E. BESSEY, Ames, Iowa.